# The burden of antimicrobial resistance (AMR) in Nauru

Executive summary

- Antimicrobial Resistance (AMR) is a major global health threat, over **2 lives** have been lost each year since 1990 in Nauru due to AMR.

- In 2021, there were an estimated **2 UI (1-2)** deaths attributable to AMR and **7 UI (5-9)** deaths associated with AMR in this location.

- The largest number of deaths associated with AMR in 2021 occurred among those aged **50 to 69** in the country.

- Among the most deadly pathogen-drug combinations in 2021 were *Acinetobacter baumannii* resistant to carbapenems, *Acinetobacter baumannii* resistant to fluoroquinolones and *Streptococcus pneumoniae* resistant to carbapenems.

Figure 1 Number of deaths by underlying cause, and those associated with AMR in 2021
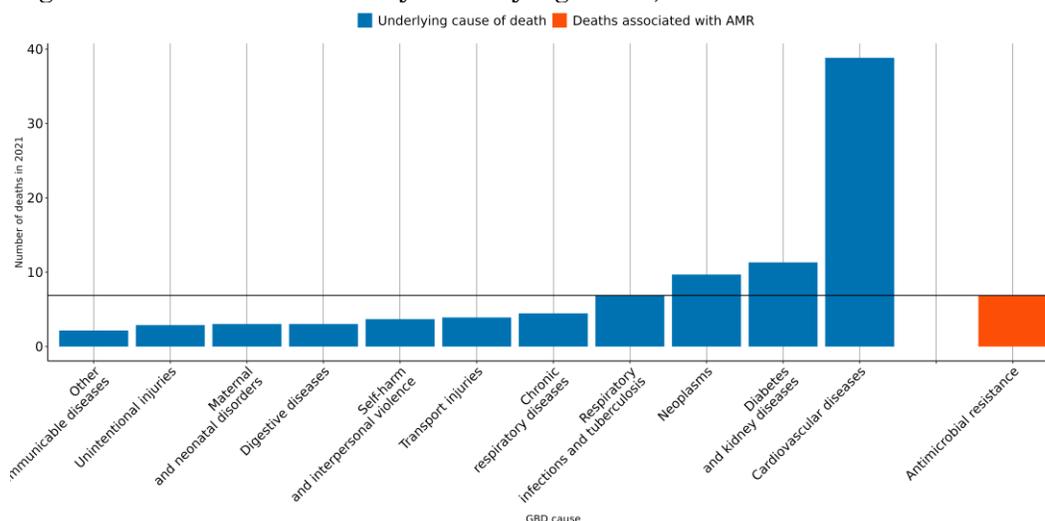

- In 2021, the number of deaths associated with AMR (orange bar in *figure 2*) were high compared to the most relevant underlying causes of death (depicted in blue) in the country. AMR associated deaths occur within multiple Global Burden of Disease (GBD) causes of death and AMR is not an underlying cause of death by itself.

- At the 2024 United Nations General Assembly high level meeting on antimicrobial resistance, country members agreed to aim for a **10% reduction** compared to 2019 baseline **(from 4.95 to 4.45 million)** in the global number of deaths associated with AMR by 2030. But our forecast indicates that in absence of concerted action, deaths associated with AMR could reach **5.5 million** (UI 4.8 - 6.2) if current trends continue. For Nauru, a 10% reduction means to decrease the number of deaths associated with AMR to **6**, but currently the trend for this country could reach up to **8 UI [5-11]** AMR-associated deaths in 2030.

AMR in Nauru

Key takeaways

- Antimicrobial Resistance (AMR) is a major global health threat, over *a million lives* have been lost each year since 1990.

- Globally, 4.71 (95% Uncertainty Interval (UI) 4.2-5.2) million deaths were associated with bacterial drug-resistant infections in 2021.

- And 1.14 (UI 1 - 1.3) million deaths were attributable to bacterial drug-resistant infection in the same year.

- *39 (UI 33 - 46) million deaths* directly attributable to bacterial AMR are projected to occur between 2025-2050 unless concerted action is taken. This equates to three deaths every minute.

Figure 2 Comparing 30 years of infection related deaths, and those associated with and attributable to AMR in Nauru between 1990 and 2019.
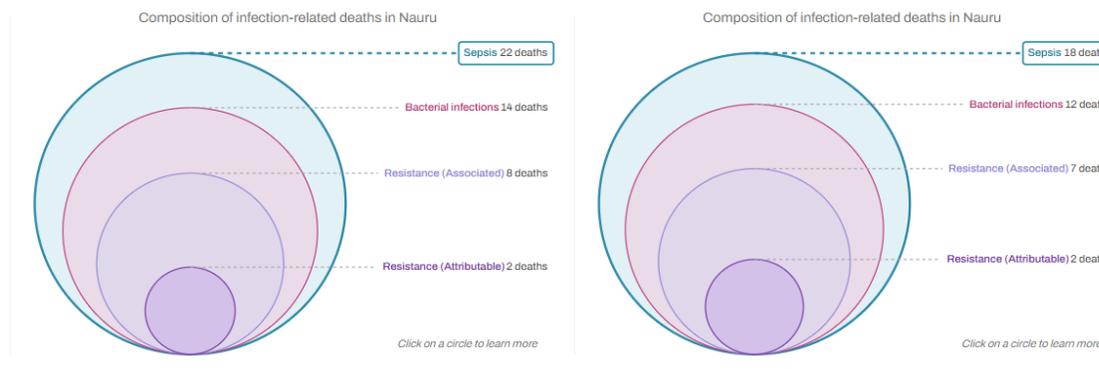
- To look at these and more visualization interactively visit Measuring Infectious Causes and Resistance Outcomes for Burden Estimation (MICROBE)

- In **Nauru** in 2021, there were an estimated **2 UI (1-2)** deaths attributable to AMR and **7 UI (5-9)** deaths associated with AMR. Here *"attributable deaths"* are considered to be those that would have been prevented had the drug-resistant bacteria causing the infections not been drug-resistant. *"Associated deaths"* are considered to be those that would not have occurred had the infections been prevented entirely.

- Across 204 countries, **Nauru has the 36th highest** age-standardized mortality rate associated with AMR in 2021.

- *Table 1* shows the bacteria which caused most deaths in 2021 (↑ indicates an increasing estimated annual rate between 1990-2021, ↓ indicates a decreasing annual trend), and *table 2* shows the pathogen-drug combinations which caused most deaths in 2021.

Table 1. Bacteria which cause most deaths in 2021 (Number of deaths in parenthesis)

Overall susceptible and resistant		Associated		Attributable	
Streptococcus pneumoniae 2 UI (2-3)	↓	Streptococcus pneumoniae 1 UI (1-2)	↓	Acinetobacter baumannii 0 UI (0-1)	↑
Mycobacterium tuberculosis 2 UI (1-3)	↓	Acinetobacter baumannii 1 UI (1-1)	↑	Streptococcus pneumoniae 0 UI (0-1)	↓
Klebsiella pneumoniae 1 UI (1-2)	↓	Klebsiella pneumoniae 1 UI (1-1)	↑	Klebsiella pneumoniae 0 UI (0-0)	↑
Staphylococcus aureus 1 UI (1-2)	↑	Escherichia coli 1 UI (1-1)	↑	Staphylococcus aureus 0 UI (0-0)	↑
Acinetobacter baumannii 1 UI (1-1)	↑	Staphylococcus aureus 1 UI (0-1)	↑	Pseudomonas aeruginosa 0 UI (0-0)	↓
Pseudomonas aeruginosa 1 UI (1-1)	↑	Pseudomonas aeruginosa 1 UI (0-1)	↑	Escherichia coli 0 UI (0-0)	↑
Escherichia coli 1 UI (1-1)	↑	Enterobacter spp. 0 UI (0-0)	↑	Enterobacter spp. 0 UI (0-0)	↑
Enterobacter spp. 0 UI (0-0)	↑	Enterococcus faecalis 0 UI (0-0)	↑	Enterococcus faecium 0 UI (0-0)	↑
Enterococcus faecalis 0 UI (0-0)	↑	Enterococcus faecium 0 UI (0-0)	↑	Serratia spp. 0 UI (0-0)	↓
Group A Streptococcus 0 UI (0-0)	↑	Serratia spp. 0 UI (0-0)	↓	Enterococcus faecalis 0 UI (0-0)	↑

Burden rank

Annualized rate of change (1990-2021): <-3%   -1.5% to 0%   1.5% to 3%   >5.0%
-3% to -1.5%   0% to 1.5%   3% to 5%

Table 2. Combinations which cause most deaths in 2021 (Number of deaths in parenthesis)

Associated			Attributable		
Acinetobacter baumannii Beta-Lactam/Lactamase Inhib.	1 UI (1-1)	↑	Streptococcus pneumoniae Carbapenems	0 UI (0-0)	↓
Acinetobacter baumannii 4GC	1 UI (1-1)	↑	Acinetobacter baumannii Carbapenems	0 UI (0-0)	↑
Acinetobacter baumannii Fluoroquinolones	1 UI (1-1)	↑	Acinetobacter baumannii Fluoroquinolones	0 UI (0-0)	↑
Acinetobacter baumannii Carbapenems	1 UI (1-1)	↑	Staphylococcus aureus Methicillin	0 UI (0-0)	↑
Streptococcus pneumoniae Carbapenems	1 UI (1-1)	↓	Klebsiella pneumoniae Aminoglycosides	0 UI (0-0)	↓
Streptococcus pneumoniae Beta-Lactam/Lactamase Inhib.	1 UI (0-1)	↓	Pseudomonas aeruginosa Carbapenems	0 UI (0-0)	↓
Acinetobacter baumannii Anti-pseudomonal	1 UI (1-1)	↑	Pseudomonas aeruginosa Fluoroquinolones	0 UI (0-0)	↑
Streptococcus pneumoniae TMP-SMX	1 UI (0-1)	↓	Klebsiella pneumoniae 3GC	0 UI (0-0)	↑
Klebsiella pneumoniae Beta-Lactam/Lactamase Inhib.	1 UI (1-1)	↑	Escherichia coli 3GC	0 UI (0-0)	↑
Klebsiella pneumoniae Aminoglycosides	1 UI (1-1)	↓	Klebsiella pneumoniae Carbapenems	0 UI (0-0)	↑

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 - Independently of antimicrobial resistance, the infectious syndromes accounting for the most deaths in 2021 were as follows (estimated thousands of deaths in parenthesis) lower respiratory infection (excl. COVID) (7 UI (5-8)), bloodstream infections (5 UI (4-6)), tuberculosis (2 UI (1-3)), infections of the skin and subcutaneous systems (1 UI (1-1)) and diarrhea (1 UI (0-1)).

Figure 3. Number of deaths associated with AMR by age group between 1990-2020 and 2050 projection

Deaths by age group: ■ 70+ ■ 50 to 69 ■ 15 to 49 ■ 5 to 14 ■ under 5
The length of each bar represents the number of deaths associated with AMR by age group
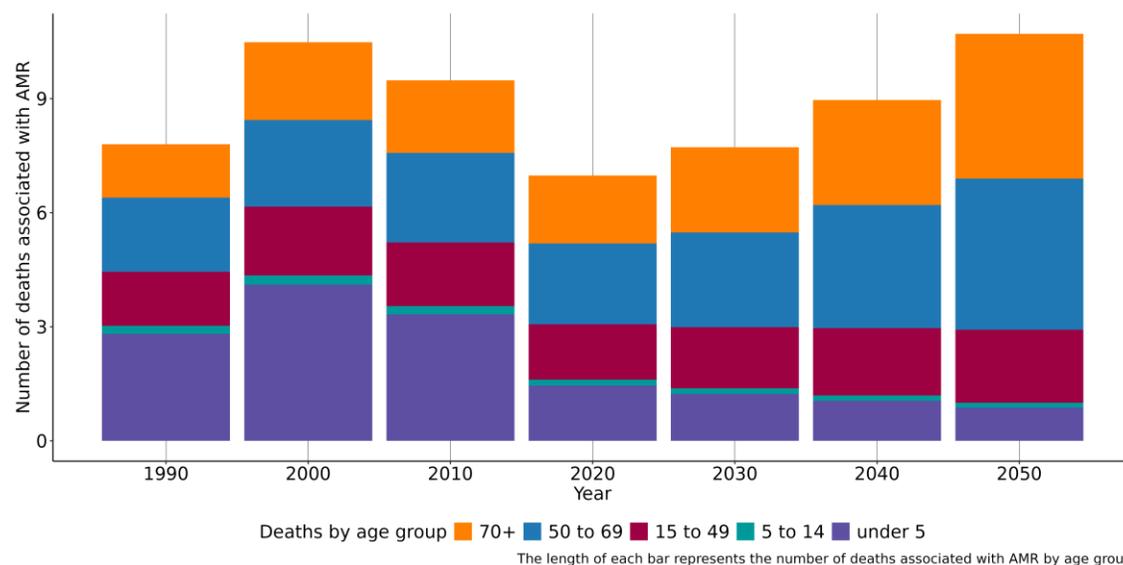
- In Nauru, people aged under 5 experienced the largest number of deaths associated with AMR in 1990 but this changed by 2021 as the largest number of deaths occurred among the 50 to 69. This indicates that prevention of infections among the under 5 has contributed to the reduction in the number of AMR associated deaths. In 2021, the number of deaths associated with AMR among the 50 to 69 was 2 UI (2-3), whereas the mortality rate per 100,000 was 797 UI (616-978).

Data sources for Nauru

In total, 520 million individual records or isolates covering 19,513 study-location-years were used as input data to our estimation process. There was no input data accessible for this country. Estimates were informed by results from the Global Burden of Disease study and data from the surrounding region. Any datasets that could be used to improve these estimates in the future are welcome.

Table 3. Data inputs for Nauru by source type

Source type	Years	Sample size	Sample size units
No other source but GBD study input	None		GBD study input

More information

About GRAM:

The purpose of the Global Research on AntiMicrobial resistance (GRAM) project is to **generate accurate and timely estimates of the magnitude and trends in antimicrobial resistance (AMR) burden** across the world, which can be used to inform treatment guidelines and agendas for decision-making and research, detect emerging problems and monitor trends to inform global strategies, as well as facilitate the assessment of interventions over time.

GRAM is the flagship project of the University of Oxford–IHME Strategic Partnership. GRAM was launched with support from the United Kingdom Department of Health and Social Care's Fleming Fund, and the Wellcome Trust.

All resources:

For all resources on AMR analysis at IHME, visit https://www.healthdata.org/antimicrobial-resistance.

To look at these and more visualization interactively visit Measuring Infectious Causes and Resistance Outcomes for Burden Estimation (MICROBE).

Data sources:

To download the list of data input sources by country, and AMR results by region, visit the Global Health Data Exchange (GHDx).

Contact us:

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